DPSCM 4155.20

DPSCM-HSTE

27 Apr 87

FOREWARD

(Supplementation is prohibited.)

This Manual is published by the Defense Personnel Support Center (DPSC) for use by inspection personnel assigned to DPSC subsistence contracts.

This Manual will be maintained in a current status and reviewed annually.

This Manual Contains extensive changes and should be reviewed in its entirely. Of particular importance are the procedures for calibrating the bimetal thermometer.

Users of this publication are encouraged to submit recommended changes and comments to improve the publication, through channels, to Directorate of Subsistence, ATTN: DPSC-HSTE.

BY ORDER OF THE COMMANDER

1 Encl

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This DPSCM supersedes DPSCM 4155.20, 11 Feb 85.

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I. REFERENCES.

A. DPSC Manual 4155.6, Subsection 209.1, Nonconformances, Reporting.

B. DPSC Manual 4155.6, Subsection 218.1, Destination Inspection.

II. PURPOSE AND SCOPE. To furnish instructions for determining the temperature of chilled and frozen products, including chilled fresh fruits and vegetables (FF&V) at destination. These instructions are applicable to Government personnel assigned to inspect DPSC subsistence items.

III. POLICY. Bi-metallic thermometers (baby dial) with a temperature scale of -40^{o}F to 160^{o}F shall be used in determining temperatures. Thermometers with a scale of 0^{o} to 220^{o}F may be used only for taking temperatures of chilled products. Electronic thermometers may be used for screening purposes, but only the baby dial thermometers will be used to report nonconformances. In order to expedite temperature determinations, three to five properly calibrated thermometers will be available for use.

IV. EQUIPMENT.

A. Adjustable bi-metallic direct-reading (baby dial) thermometer, with case (NSN 6685-00-444-6500).

B. Knife, razor or similar cutting tool.

C. Suitable boring or piercing tool (e.g., ice pick, meat trier, electric drill or hand drill).

D. Tape, pressure sensitive adhesive or similar item.

E. One pint insulated container.

F. One adjustable wrench.

V. PROCEDURES.

A. Procedure for Calibrating the Bimetal Thermometer (Ice Point Method).

1. The ice point method as described here permits calibration to within 0.1^{o}F. This method should be used to calibrate all thermometers used to monitor the temperature of chilled and frozen food products.

2. Fill an insulated one-pint container with a 50:50 mixture or portable ice and potable water. We suggest using a one-pint wide mouth “thermos” bottle.

NOTE: Ice must be present in the mixture during the entire procedure to provide an environment of 32^{o}F (0^{o}C) throughout the container. You may have to place More ice into the container during the procedure if several thermometers are Being calibrated over an extended period.

3. Allow four to five minutes for the water and ice mixture to stabilize (reach temperature equilibrium).

4. Insert the bimetal thermometer stem into the ice water solution at least to its immersion depth. Since the immersion depth may vary from two to four inches, you must read the manufacturer's instructions to determine the minimum immersion depth.

NOTE: Ensure that the stem of the bimetal thermometer does not touch the bottom or the sides of the insulated containers (one inch clearance minimum). This can be accomplished by drilling a hole (slightly larger than the thermometer stem) in the outer cap of the thermos bottle. Insert the thermometer all the way to the adjustment nut. This will allow sufficient clearance at the bottom. As an alternative to the outer cap of the thermos bottle, you may use a plastic coffee can lid or a piece of corrugated fiberboard.

5. Stir the mixture one or two turns with the thermometer stem to dissipate the stem heat.

6. The bimetal thermometer should be left in the ice water mixture for a minimum of one minute or until the needle is stable for 30 seconds.

7. Using a wrench or pliers, adjust the bimetal thermometer to read 32^{o}F by turning the adjusting nut located on the bottom of the dial face.

NOTE: This adjustment must be made while the thermometer stem is still immersed in the ice and water mixture. Avoid touching the stem of the thermometer while making adjustments.

B. Procedure for Calibrating the Bimetal Thermometer (Boiling Point Method). The boiling point method of calibration is accurate to with one degree Fahrenheit. This method should be used if the thermometer is being used to monitor cooking and steam table temperatures in food service facilities. This method may also be used in conjunction with the ice point method to detect damaged thermometers. First calibrate the thermometer with the ice point method then tests the thermometer using the boiling point method. If the thermometer does not register the boiling point (plus or minus the stated accuracy of the thermometer and the accuracy of the method), the thermometer should be considered damaged and be discarded. For example, if the stated instrument accuracy is plus or minus (+/-) 2^{o}F and the method accuracy is +/- 1^{o}F, the thermometer tolerance at the boiling point is 209^{o}F to 215^{o}F (212 +/- 3^{o}F) at sea level.

1. Place a container of potable water on a heating element. After the water has reached a complete "rolling" boil, insert the thermometer to the appropriate immersion depth.

NOTE: Ensure that there is at least two inch clearance between the stem or sensing element and the bottom and sides of the container.

2. Hold the thermometer in the boiling water until the reading stabilizes.

3. In the boiling point method, you must take into account your elevation above sea level. Use this rule of thumb: For each 550 feet above sea level, the boiling point of water is lowered 1^oF. For example, if you are at an elevation of 5,000 feet, the boiling point of water is approximately 203^oF (5,000/550 = 9.09^oF, and $212^o - 9.09^oF = 203^oF$).

C. Temperature Determination – Initial Inspection. Sampling and inspection shall be in accordance with reference I.B. Temperature determinations made by using the bi-metallic (baby dial) thermometers shall be conducted as follows:

1. Frozen or Chilled Products (excluding dairy products and chilled FF&V in shipping containers (cases)). One of the following two methods shall be used. Method II shall be used when Method I would damage the shipping container beyond reuse.

a. Method I.

(1) Open the top of the shipping container and remove two unit (primary) containers from one corner.

(2) With ice pick, meat trier or similar tool, punch a hole in the shipping container from the inside. Do not use the stem of the thermometer.

(3) Position hole so that when the thermometer is inserted from the outside it fits snugly between the unit (primary) containers.

(4) Insert the thermometer stem not less than three inches. Replace the two unit (primary) containers in such a manner that subparagraph V.C.1.a.(3) is complied with the close the case.

(5) Leave the baby dial thermometer in place five minutes. Record the temperature, remove the thermometer, and seal the hole.

b. Method II.

(1) Cut a small flap in the side or end of the shipping container with a razor, knife, or other sharp instrument.

(2) Open the flap and insert the thermometer into the case between the unit (primary) containers to a distance of not less than three inches.

(3) Close the flap to hold the thermometer in place.

(4) Leave the baby dial thermometer in place five minutes. Record the temperature, carefully extract the thermometer, and tape the hole.

2. Chilled FF&V. Whenever a pulp temperature (internal temperature of an individual product) is specified, temperature determination shall be conducted in accordance with one of the following two methods:

a. Leafy Vegetables. (Broccoli, brussel sprouts, cabbage, cauliflower, celery, endive, escarole, lettuce and romaine.) Insert a thermometer into the item as close to the center as possible without entering the core or heart leaves (see Enclosure 1). When using the baby dial thermometer, leave in place five minutes. Record the temperature, extract the thermometer, and reseal the package (if appropriate).

b. Non-Leafy Vegetables and Fruits. (Apples, avocados, bananas, beets, carrots, cucumbers, corn on the cob, eggplant, grapefruit, lemons, limes, melons, nectarines, onions, (dry), oranges, parsnips, peaches, peppers (sweet), pears, pineapples, plums, potatoes (sweet), pumpkins, rutabagas, squash, tangerines, and turnips.) Insert a thermometer into the center of the item or into the package from the container. Do not allow the thermometer to come in contact with the pit of stone fruits (peaches, plums, etc. – see Enclosure 1). Leave the baby dial thermometer in place five minutes. Record the temperature, extract the thermometer, and reseal the package (if appropriate).

D. Temperature Determination – Additional Inspection. If initial destination inspection temperature results indicate that a temperature nonconformance exists, additional temperature determinations shall be conducted in accordance with reference I.B. and the following:

1. Chilled and Frozen Products (excluding chilled FF&V).

a. Expose product in order to insert thermometer into the product (if necessary).

b. Make a hole, at least three inches deep and with a diameter equal to that of the thermometer, in the thickest part of the item. For frozen products, use a meat trier, electric drill or similar device. When an electric or hand drill is used, the drill bit should produce a hole four inches deep with a diameter not more than 1/16 inch larger than the thermometer stem. The tool probe (i.e., drill bit, awl, or punch) used to produce the hole will be cleaned and sanitized after each use. Tools made of other than stainless steel will be coated with an edible oil to prevent rust. Do not use the thermometer to make the hole.

c. Insert the baby dial thermometer. Ensure that the tip of the thermometer does not enter the body cavity. Thermometers are to be left in product a minimum of five minutes. This minimum time is especially critical when an electric drill is used, because friction from drilling may cause a temporary rise in temperature of the surrounding area.

d. Record the temperature, carefully extract the thermometer, and reseal container (if applicable).

2. Chilled FF&V. Temperature determination shall be in accordance with the procedures of subparagraph V.C.2.

E. Reporting Recorded Temperatures. Temperature defects shall be classified in accordance with the contractual documents. Temperature nonconformances shall be reported in accordance with reference I.A.

F. Sanitary Practice. Thermometers, meat triers, electric drills or any device which contacts or penetrates the food product being tested must be sanitized after each use.

ENCLOSURE 1
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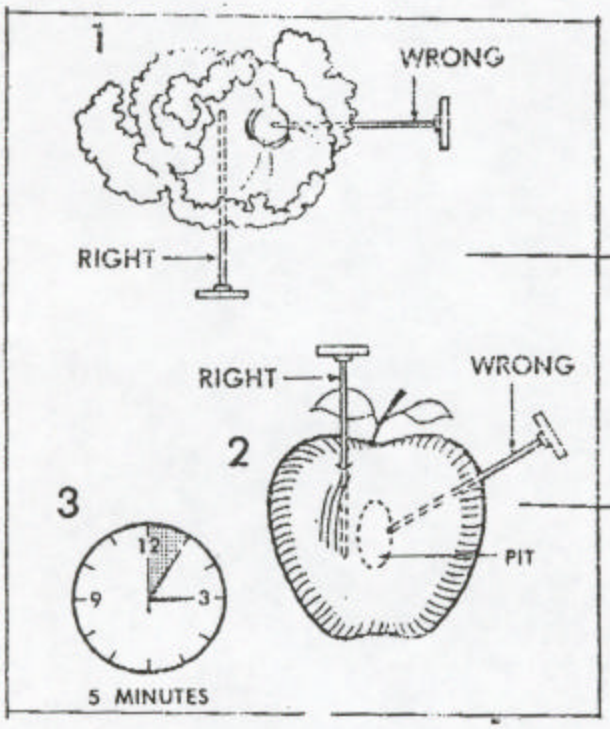

Correct method for taking temperatures of chilled FF&V.

Leafy Vegetable

Stone Fruit